

CLM-PTO

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1. A method of making a diamond product by etching, said method comprising the steps of:

forming a diamond substrate with a mask layer; and etching said diamond substrate formed with said mask layer with a plasma of a mixed gas composed of a gas containing an oxygen atom and a gas containing a fluorine atom;

wherein said fluorine atom has a concentration within the range of 0.04% to 6% with respect to the total number of atoms in said mixed gas.

2. A method of making a diamond product according to claim 1, wherein said plasma is produced by generating a high-frequency discharge between two plate electrodes arranged in parallel; and

wherein said high-frequency discharge is generated by supplying an electric power of at least 0.45 W/cm<sup>2</sup> between said plate electrodes.

3. A method of making a diamond product according to claim 1, wherein said gas containing said fluorine atom is CF<sub>4</sub> gas; and

wherein said CF<sub>4</sub> gas has a concentration within the range of 0.02% to 3% with respect to the total number of molecules in said mixed gas.

4. A method of making a diamond product according to claim 1, wherein said gas containing said oxygen atom is one of O<sub>2</sub>, CO<sub>2</sub>, and a mixed gas composed of O<sub>2</sub> and CO<sub>2</sub>.

Claims 5-7 are canceled

8. A method of making a diamond product by etching, said method comprising the steps of:

forming a diamond substrate with a mask layer; and etching said diamond substrate formed with said mask layer with a plasma of a mixed gas composed of a gas containing an oxygen atom and a gas containing a halogen atom;

wherein, in an emission spectrum of said mixed gas, an intensity A of an emission peak caused by said oxygen atom and an intensity B of an emission peak caused by oxygen have an intensity ratio A/B which is greater than the intensity ratio A/B obtained from an emission of a plasma which is 100% oxygen.

9. A method of making a diamond product according to claim 8, wherein said gas containing said halogen atom is  $\text{CF}_3$ , and wherein said mixed gas further contains nitrogen gas.

10. A method of making a diamond product according to claim 8, wherein said emission peak caused by said oxygen atom has a half width of 3 nm or less, and wherein said emission peak caused by oxygen has a half width greater than 3 nm.